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BEES COLLECTED IN ARIZONA AND CALIFORNIA IN THE SPRING OF 1937

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In March and April of the present year my wife and I collected in the region about Yuma, Arizona, and in Southern California. When we were at Yuma the early flowers were appearing, but the season throughout the southwest was very late (some said a month late), following the severe frosts which had proved so disastrous to the fruit industry. On the other hand, the unusual amount of moisture stimulated the growth of the desert plants, which were not injured by the cold. In the latter part of April the Mojave Desert, in particular, was a glorious sight, with its masses of variously colored flowers, the species differing remarkably in different parts of the area. The bee-fauna is extraordinarily rich, and every day's collecting yielded species new to science. In addition to those described below (the holotypes of which will be found in The American Museum of Natural History), we collected many other undescribed species, which had previously been taken by Mr. Timberlake, and are provided with manuscript names in his collection. We also obtained some which are likely to be new, but should be studied in connection with other materials; some of these have possibly been described in manuscript by Charles Michener. In a few cases the specimens, ascribed to known species, do not seem quite typical, and further consideration of them is deferred.

A brief excursion into Baja California (Mexico) from Yuma, and another across the boundary from Jacumba (alt. 2900 ft.) did not produce a single bee. From Yuma we made excursions into the dry country about the small settlements called Dublin and Dome and also across the Colorado River into the sandhill country of California, where our friend, Mrs. Leslie C. (Estelle) Dingess, has charge of a rural school. The pupils of this school (Andrade, Imperial County) took an interest in our work, and with their teacher have been collecting bees since we left. A consignment already received includes many good things, one here described as new, and three of Timberlake's unpublished species.

We were fortunate in being able to spend several days at Morongo, alt. 2600 ft., in a pass between the Mojave and Colorado Deserts, just

within the limits of San Bernardino County. This is about fifteen miles north of Palm Springs, and is a locality of unusual interest, with a rich flora. The larger vegetation includes an abundance of junipers (*Juniperus californica* Carrière) and stout yuccas (*Yucca mohavensis* Sargent).[1] The brilliant flowers of the beaver tail cactus (*Opuntia basilaris*) attract *Diadasia*. The peculiar chia (*Salvia columbariae* Bentham) was visited by an undescribed *Anthophora*. Species of *Phacelia*, especially the so-called wild heliotrope (*P. distans* Bentham) were attractive to bees. The yellow desert dandelion (*Malacothrix californica glabrata* Gray) was visited by some bees, including a new *Perdita* which will be published by Timberlake. The *Larrea* was not yet in flower. Species of *Gilia* (*G. inconspicua* (Smith) and *G. aurea decora* Gray, in particular) were abundant, but I obtained no bees from them. This seemed strange, as *Gilia calcarea* Jones, in Colorado, attracts many species of bees (see Novitates, No. 766). The *G. aurea decora* I could not identify, so I sent it to Dr. P. A. Munz. It is very abundant, and constant in its characters, and appears to me to be a distinct species. The true *G. aurea* not only has the flowers quite differently colored, but also a different, erect mode of growth, as figured by Brand.

We were greatly indebted to various people for their assistance and good fellowship, and the names of several will be noted as collectors. As in previous years, we owed the possibility of doing what we did mainly to Mr. and Mrs. P. H. Timberlake. Dr. and Mrs. John A. Comstock of Los Angeles, and Mr. and Mrs. John L. Sperry of Riverside, were with us in the Mojave Desert. Commander C. M. Dammers went with us to his favorite Gavilan locality,[2] where *Andrena zygadeni* (discovered by Dammers), one of the finest species of the genus, was flying about the *Zygadenus* in quantity. Dr. Comstock is preparing an illustrated work on the moths of California, a companion to his 'Butterflies of California,' published years ago. Commander Dammers has made many discoveries, of Lepidoptera, Mutillidae and bees. A splendid *Emphoropsis* which he found, and which is called after him, was described by Timberlake while I was at the Citrus Station. We collected both sexes of a

[1] I collected at night a specimen of the moth *Prodoxus pulverulentus* Riley (det. Busck). This has been recorded as breeding in *Yucca whipplei* Torrey, but at Morongo it must breed in *Y. mohavensis*, the only *Yucca* in the immediate vicinity.

[2] I venture to quote from a card received from Timberlake, dated May 31, 1937: "It has been cold and cloudy for about ten days, but today bright and warm, and I took Philip and went out to the Gavilan. Discovered a genus that I have never collected or even seen before. I believe it must be *Trachusa*, perhaps your *T. perdita*. Took quite a series on flowers of *Pentstemon antirrhinoides*, a large bush with yellow flowers. Males have a white face, female entirely black, both sexes with a narrow white band or fringe on apex of tergites. On the same flower a *Centris*, probably *C. hoffmannseggiae*. On the common *Eriogonum* (*E. fasciculatum*) a very small *Hesperapis* was common, but my specimens are apparently all males. This I think must be a new species, one that I have not taken before, unless it is the same as a small one from the Palm Springs region."

large new *Anthophora*, which is also to be dedicated to Dammers. But the principal work of Dammers has been on the life-histories of Lepidoptera, considerably over 200 species having been worked out and illustrated. The Sperrys have a very large collection of Lepidoptera, and have found some novelties. Mrs. Sperry specializes in the Noctuidae.

Hypomacrotera andradensis, new species

FEMALE (type).—Like *H. subalpina* (Cockerell), described from New Mexico, but eyes red-brown to black, never green (pea-green in *H. subalpina*); face-marks reduced, those at sides of clypeus consisting of broad bands along the lateral thirds of the lower margin, remote from the dog-ear marks (in one specimen the face-marks are almost absent, nothing being left but two small spots at each side of clypeus). Wings longer and appreciably grayish. Abdomen variable but inclined to be darker apically, and often with a dusky spot in middle of first tergite.

MALE.—Eyes colored as in the female, never green (green in *H. subalpina*); clypeus with a light band along its lower margin, with a small oblique extension upward at each side; labrum black (largely pale in *H. subalpina*); mandibles black with the base pale (red beyond the base in *H. subalpina*); nervures darker than in *H. subalpina*.

California: Andrade, across the river from Yuma, Arizona, both sexes very numerous at desert mallow (*Sphaeralcea*); collected by Mrs. Estelle Dingess and her pupils of the Andrade school.

The name is intended to commemorate the admirable little school, the pupils of which have collected many bees. This insect was already known to Mr. P. H. Timberlake from Southern California, but he considered it the same as *H. subalpina*, judging by the published descriptions. The actual comparison of specimens shows several differences, but it may be that the insect should rank as a subspecies. True *H. subalpina* has been seen from Arizona, no special locality indicated.

In the description of *Hypomacrotera callops*, Cockerell and Porter, it is not stated which sex includes the holotype. I now so designate the male.

Melitta wilmattae, new species

FEMALE.—Length about 15 mm., anterior wing 9.5 mm., width of head 4 mm.; black, with mainly white pubescence, abundant on head and thorax; a few dark hairs about ocelli, but none at sides of face; hair of thorax above very slightly flavescent or grayish, with a few black hairs interspersed on disc. Head somewhat broader than long; mandibles long and stout, very faintly reddish apically, with an inner tooth far from the end; malar space very short; antennae black, flagellum obscurely reddish beneath; flagellum short, truncate at apex; face with long hair; clypeus polished and shining; process of labrum prominent, feebly bilobed. Mesothorax densely covered with hair, except the posterior middle, which is shining; scutellum shining between the evident punctures, and with a median groove; area of metathorax dull,

rugose but not plicate, and with no median plica; posterior face of metathorax dull, very hairy; tegulae black, covered with hair in front. Wings grayish hyaline, with the usual venation of the genus; stigma very narrow, with a heavy dark margin and a light median streak; nervures black; basal nervure falling barely short of nervulus; second cubital cell parallel-sided, a little higher than broad, receiving first recurrent nervure at about the end of the first third; second cubital cell on marginal about the same as third. Legs with mainly white hair, but black at base of hind tibiae externally, brownish at end of front tibiae, seal brown on apical half of middle tibiae externally; hair on inner side of hind tibiae pale yellow; hair on inner side of basitarsi red. Abdomen rather parallel-sided, shining; first tergite with long white hair at sides, and broadly posteriorly; second to fourth tergites with entire, narrow but conspicuous, pure white apical hair-bands; fifth with long white hair, and dark hair in apical middle; hair of apex dark gray-brown; apical plate somewhat shining, without distinct sculpture.

Arizona: Dublin (near Yuma), one at flowers of *Sphaeralcea*, March 8, 1937 (Wilmatte P. Cockerell). Mr. Timberlake has never taken a *Melitta* in Southern California.

Related to *Melitta californica* Viereck, from Lower California, but without black hair at sides of face, and area of metathorax without a median plica. The stout inner tooth of the mandibles distinguishes it at once from *Dolichochile melittoides* Viereck, which should be called *Melitta* (*Dolichochile*) *melittoides*. I have a specimen of *M. melittoides* collected by Viereck at flowers of *Xolisma ligustrina* (Linnaeus), Beltsville, Maryland, July 5, 1917.

Nomada mckenziei Timberlake and Cockerell, new species

FEMALE (type).—Length 7.5–9 mm., anterior wing 6 mm.; head and thorax black, tubercles more or less reddish, clypeal margin sometimes reddish, and there are sometimes two red spots on the scutellum; hair of head and thorax dull whitish, varying to fulvescent. Head transverse, broader than long, the orbits converging below; mandibles simple, robust, clear red with the apex black; clypeus and adjoining parts of face dull, very densely and finely punctured; antennae long, reaching middle of scutellum, third joint about as long as fourth on upper side; scape red in front, or with only two red spots; flagellum stout, clear red, faintly or distinctly dusky above, with a black mark on inner side at base. Mesothorax and scutellum dull, finely punctured, the mesothorax more coarsely posteriorly, and with a median groove; scutellum not bigibbous; base of metathorax dull and granular; tegulae clear red. Wings dilute fuliginous; stigma and nervures black or nearly so; basal nervure going considerably basad of nervulus; second cubital cell nearly parallel-sided, receiving first recurrent nervure slightly beyond middle; third cubital cell greatly narrowed above. Legs bright red, with the coxae black, or hind coxae mainly red; trochanters black beneath; tibiae with the apical process long, extending outward. Abdomen broad, only moderately shining, deep red, without markings above or below, fifth tergite with an apical pale fringe.

MALE.—Length 9 mm., anterior wing 7 mm.; in most characters similar to female, but differing thus: pubescence of head and thorax very pale ochraceous, al-

most white, long and rather dense, especially on face, where it is subappressed and dense enough to conceal the surface; pubescence of abdomen fine, appressed and silky, becoming much larger around the apex, and forming an erect fringe on the apical margins of the ventral segments. Third antennal joint on its short side about two-fifths as long as fourth; apex of seventh tergite rounded, distinctly notched. Color similar, but mandibles on basal half, malar space and orbital margins opposite clypeus, yellow; scape entirely black; flagellum black above and dull ferruginous beneath; coxae and trochanters black as in female, as also front femora beneath, and middle and hind femora both behind and beneath; front and middle tibiae with a small black blotch behind; legs otherwise not so bright red as in female, and having the front tibiae anteriorly, the hind tibiae at apex, and the basitarsi, somewhat yellowish; abdomen with nearly the basal half of first tergite black.

California: The Gavilan, April 11, 1937 (Dammers) One female. This is the holotype, but the species was taken at the same locality by Commander Dammers, March 18, 1934 and March 12, 1935. The first specimen, collected also from the same place, was taken by H. L. McKenzie on March 11, 1933. All these are females; the only known male, from the same place, at flowers of *Eriogonum fasciculatum* Bentham, March 19, 1936, was taken by Timberlake. The species was named in manuscript by Timberlake after its discoverer. The above description of the female is by Cockerell, that of the male by Timberlake. This insect has been taken only at a place where *Andrena zygadeni* Cockerell is abundant at the same season, visiting flowers of *Zygadenus fremontii* Torrey. I suspect the *Nomada* is parasitic on this *Andrena*, but it must be said that other species of *Andrena* (*A. trifasciata* Timberlake and Cockerell, *A. blaisdelli* Cockerell and *A. opaciventris* Cockerell) also occur there. The *A. blaisdelli* was taken there by Dammers, March 6, at *Oenothera dentata*.

In my key to Californian *Nomada* (1903), *N. mckenziei* runs out near *N. elegantula* Cockerell, which has the abdomen differently marked, and is not very similar. In my key to Rocky Mountain species it runs out at *N. sidaefloris* Cockerell, which has black legs. Many species have been described since these tables were published, but I cannot identify it with any of them.

Nomada edwardsii Cresson

California: Morongo, one female, April 20, 1937 (W. P. Cockerell).

It is surprising to find this species in a semidesert environment. The specimen differs from those collected at Olympia, Washington and Corvallis, Oregon, by having large yellow spots on the axillae. The yellow discal stripes on the mesothorax are well developed.

Bombomelecta edwardsii (Cresson)

California: Morongo, one female at flowers of *Phacelia*, April 22, 1937 (W. P. Cockerell).

This was determined by Timberlake as *B. edwardsii*, a species described by Cresson from a male labeled California. It nearly agrees with the description of *B. zygos* Viereck, based on a female from California; it appears to differ by having the abdomen only faintly bluish, and the mesothorax densely but coarsely punctured. Viereck suggested that his species might be the female of *B. edwardsii*. In the same general region, at Palm Springs, Mr. Timberlake has taken *B. larreae* Cockerell, at flowers of *Eriodictyon*.

I have also a female *B. edwardsii* from Los Angeles, collected long ago by Davidson.

Anthidium palmarum Cockerell

California: Morongo, April 19, 20, 1937, both sexes (T. D. A. and W. P. Cockerell); fifteen miles east of Palmdale, male at flowers of *Salvia carduacea* Bentham, April 26, 1937 (Mrs. J. A. Comstock).

I am placing the holotype of *A. palmarum* in the American Museum.

Anthidium cockerelli Schwarz

Arizona: Dublin, at flowers of *Encelia*, March 8, 1937 (Cockerell). A female, determined by Mr. Timberlake.

The species was described from the male. The female runs in the table given by Schwarz (Am. Mus. Novitates, No. 253) to 2, but differs by having tergites 1 to 4 four spotted, the spots subquadrate, or not at all linear; the fifth tergite lacks the lateral spots, the sixth has a pair of large spots, narrowly separated in middle. The mandibles are mainly light yellow, but the face is entirely black though there are two light spots above the eyes. The flagellum has a bright red band beneath. The scutellum has two spots, but the axillae are black.

Anthidium dammersi, new species

MALE (type).—Length about 9 mm., anterior wing 6.8 mm.; black, with the light markings pale yellow, lemon-yellow on abdomen; pubescence clear white, long and abundant on head and thorax. Eyes black or dark slate-color; face densely hairy; mandibles bidentate, with a cream-colored stripe reaching beyond middle; clypeus, and lateral marks filling space between clypeus and eye, yellow; a yellow spot above each eye; antennae entirely black. Thorax without light markings; tegulae yellow, with a large shining black spot. Wings hyaline, very faintly brownish apically; basal nervure going far basad of nervulus; outer recurrent interstitial. Anterior tibiae with a yellow stripe its whole length in front, or this may be broken in the middle; middle and hind tibiae spotted at base and apex; basitarsi light yellow.

Abdomen polished, first tergite with four spots, second to fifth with the spots united at sides by slender yellow lines, the outer spot on fifth nearly obsolete; sixth with two comma-like yellow marks; seventh all black; a sharp spine at each side of sixth tergite; seventh with apical lobes broad and pointed, the median spine rather short.

FEMALE.—Length about 9 mm. Mandibles with two large teeth and three minute ones; head entirely without light markings, except a yellow spot above each eye. Thorax without light markings. Tibiae black, with a small light spot at base; front and middle basitarsi pale, hind basitarsi black. Abdominal markings cream-color, sixth tergite entirely black, first four-spotted; ventral scopa white (full of bright orange pollen). The scutellum may have a pair of light marks.

California: nine miles north of Adelanto, Mojave Desert, April 25, ten males and two females (T. D. A. and W. P. Cockerell).

This species was discovered by Commander C. M. Dammers, and recognized as new by Mr. Timberlake, who asked me to describe it. Shortly after the discovery by Dammers, we went to the exact spot and got a good series. The bees were found only at flowers of *Astragalus fremontii* Gray. In the table by Schwarz (Novitates, No. 253) the male runs near *A. utahense* and *A. fontis*, or could possibly be sought near *A. tenuiflorae*. The female runs best to *A. tenuiflorae*. Compared with *A. tenuiflorae*, the lobes of the pygidium are more produced and angulate, the sinus between lobe and median spine deeper and narrower. The female differs from *A. tenuiflorae* in the form of the abdominal markings ,which on tergites 2 to 4 take the form of narrow long clubs with a very slender base (not as long as the club), and a subcuneiform swelling at the outer or lateral end. The male *A. angulatum* Cockerell has pointed apical lobes, but the whole configuration of the tergite is different. *A. fontis* Cockerell has extensive yellow face-marks in the female. *A. utahense* Swenk is excluded for similar reasons. On the whole, I believe *A. dammersi* to be a Mojave Desert representative of *A. tenuiflorae* Cockerell, sufficiently distinct to stand as a species.

Along with *A. dammersi*, at the same flowers, we took *Osmia titusi* Cockerell and *O. timberlakei* Cockerell.

Xenoglossodes arizonica, new species

MALE.—Length about 13 mm., antennae about 9 mm.; black, including the tarsi. Mandibles all black, but the convex shining clypeus very pale yellow, the yellow deeply notched on each side, while the labrum is white, with a large dark mark at each extreme side; eyes black or nearly so; the light pubescence is white, a little grayish, but not at all fulvous, dorsally; facial quadrangle about as broad as long; third antennal joint very short. Mesothorax very hairy, dull, posteriorly shining; tegulae dark, densely covered with hair. Front and middle tarsi very long; spurs very pale, hind spur not modified; the hair on inner side of hind basitarsi pale, not brightly colored. Wings hyaline, with dark nervures, basal nervure falling short of

nervulus. Abdomen with long hair at base, otherwise covered with short pale tomentum, leaving the broad apical margins of second and third tergite exposed and intense black, the fourth has a much narrower black margin, the sixth is densely white-tomentose apically, apex of venter sharply pointed; some dark brown hair on under side of abdomen.

Arizona: West of Dome (Yuma County), at flowers of *Lycium*, March 7, 1937, four males (Cockerell, Hobart, Dingess).

Readily distinguished from *Tetralonia lycii* Cockerell (New Mexico) by the light hair at end of abdomen, and the short third antennal joint. In my key it falls nearest to *T. frater* (Cresson), described from Colorado, but differs in the pubescence of abdomen and legs. It is quite distinct from all the species taken by Timberlake in California.

I described this species as a *Tetralonia*, having no doubt that it belonged to that genus. However, Timberlake, suspecting something, examined the genitalia and mouth-parts, and reports (litt. May 20, 1937), "I have extracted the genitalia of the specimen you gave me, and find them to be of the *Xenoglosodes* type. Also, the maxillary palpi are five-jointed instead of six."

In *Xenoglossodes* it is perhaps as near to *X. lippiae* Cockerell as to anything, but very distinct by the polished cream-colored clypeus, and the pattern of the abdomen.

Spinoliella puellae Cockerell

California: Morongo, at flowers of *Malacothrix californica glabrata* Gray, males, April 21 (Cockerell).

Diadasia opuntiae (Cockerell)

California: Morongo, at flowers of *Opuntia basilaris* Engelmann and Bigelow, April 22 (Cockerell); on road to Morongo, but in Riverside County, at flowers of *Echinocactus acanthodes* Lemaire, April 29 (W. P. Cockerell).

Centris pallida Fox

California: Andrade, at flowers of *Cercidium floridum* Bentham, April 19, 1937 (Louis Southwick).

Arizona: Yuma, spring of 1937 (R. M. Young).

Centris lanosa Cresson

California: Andrade, at flowers of *Cercidium floridum*, April 19 (Louis Southwick). Male.

It was thought that this might be the undescribed male of *C. cockerelli* Fox, but I cannot separate it from *C. lanosa*.

Anthophora hololeuca Cockerell

California: Andrade, at flowers of purple sage, April 19 (Estelle Dingess).

Described from Angel de la Guardia Island, in the Gulf of California, but Timberlake finds it common in the desert of Southern California.

Anthophora neglecta Timberlake and Cockerell

California: Morongo, April 20 (W. P. Cockerell); near Adelanto, Mojave Desert, April 26, females, eyes black in life (John L. Sperry).

A variety of the female, with yellowish hair on thorax above, comes from Phelan, April 26 (Cockerell).

Anthophora texana Cresson

California: Andrade, at flowers of *Lycium*, April 19, female (B. Ball and R. L. Davis).

The eyes are much darker than in one from Mesilla, New Mexico.

Anthophora (Micranthophora) columbariae Timberlake and Cockerell, new species

MALE (type).—Length about 9 mm., anterior wing 5 mm.; black, the flagellum obscurely reddish beneath, clypeus with a narrow pale apical band, labrum very pale yellow with a pair of black spots, mandibles with the basal half pale yellow, the tarsi reddened apically, the tegulae translucent pale testaceous; eyes greenish, becoming blackish in dried specimens. Discs of mesothorax and scutellum highly polished; area of metathorax dull, with a shining margin and with a strong groove in middle; middle tarsi long, but not remarkably so. The wings hyaline with dark nervures, basal nervure falling a little short of nervulus; second cubital cell receiving first recurrent nervure at middle. Hair of head and thorax very abundant, pure white, on face very dense, entirely covering the surface; tibiae and basitarsi with much white hair, hind basitarsi with red hair on inner side; abdomen with long white hair on basal part of first tergite; tergites 1 to 4 with fine white tomentum, lacking basally, so that there are more or less evident (according to extension of abdomen) black basal bands; fifth tergite without white tomentum, the margin broadly more or less pallid; sixth similar, with a little white hair at sides; apex with a pair of rather widely separated red divergent teeth.

FEMALE.—Head broad, clypeus with a shining middle line, and a transverse very pale yellowish apical band, which is angular above in middle; labrum and mandibles marked as in male. Vertex with long black hairs; thorax above with hair grayish, strongly mixed with black; hair on inner side of hind basitarsi appearing nearly black in one view, red in another; tergites 1 to 4 covered with fine white tomentum, fifth black, abruptly contrasting.

California: Morongo, April 20–22, 1937 (Cockerell, W. P. Cockerell). Many specimens, flying around *Salvia columbariae* Bentham.

In the table in Trans. Amer. Ent. Soc., XXXII (1906), pp. 66–67, the male runs out at 8, on account of the dark antennae, combined with

dark fifth tergite. The female runs nearest to *A. anstrutheri* Cockerell, but that is larger, with yellowish hair on abdomen, and only a triangular black patch on fifth tergite; also, the clypeus has a broad yellow band, and there is a supraclypeal mark. There is no close affinity with any of the species described in Proc. Calif. Acad. Sci., XII (1923), pp. 79–83, or with other recently described forms.

The following specimens, in the Timberlake collection, are to be considered paratypes:

The Gavilan, California, 1 ♂, March 27, 1933 (Dammers). The first specimen seen by Timberlake.

Deep Creek, California, May 5, 1936 (Timberlake), on *Eriodictyon trichocalyx*. This is at junction of Deep Creek and Mojave River.

Mojave River, near Deep Creek, on *Salazaria mexicana* Torrey, May 16, 1937 (Timberlake). This had collected two kinds of pollen, including salmon-colored pollen from *Salvia carduacea*. One ♀.

One and one-half miles west of Perris, California, 1 ♀, on *Salvia columbariae*, April 18, 1937 (Timberlake).

Morongo, male on *Cryptantha*, female on ground, April 22, 1937 (Timberlake); also six taken at Morongo by T. D. A. and W. P. Cockerell.

"The females are all very similar, except that the Perris specimen has whitish band on clypeus narrower than usual. All my males, except the four collected by Mrs. Cockerell, lack the whitish band on clypeus (beneath the white hair). The male from Deep Creek has the flagellum strongly fulvous-reddened, but irregularly and not uniformly so as to each antenna. It also has a large red streak on hind femora both in front and behind." (Timberlake.)

Alcidamea biscutellae Cockerell

Arizona: Yuma, spring of 1937 (Ralph M. Young). Both sexes. New to Arizona.

There is a large thorn-like projection at base of male abdomen beneath, the point directed downward and forward. This was overlooked in the original description (Ann. Mag. Nat. Hist., April, 1897, p. 400). For the female, see Pan-Pacific Entomologist, April, 1935, p. 51.

Chlorosmia lawae Michener

California: Morongo, at flowers of *Lupinus*, April 22, female (W. P. Cockerell).

Osmia clarescens Cockerell

California: Morongo, at flowers of *Lupinus*, April 20, female (W. P. Cockerell).

Osmia gaudiosa Cockerell

California: Morongo, April 20, female (Cockerell).

This has the ventral scopa black. Many years ago Mrs. M. Ellis found in Colorado what I took for the female of *O. gaudiosa*, and the scopa was reddish white. I now doubt whether I correctly associated the sexes. Timberlake writes concerning *O. gaudiosa:* "I have two males from Boulder, but no females. I have compared the California *gaudiosa* again and find no distinctive characters, although the flagellum is darker. My females vary from green to blue and are generally decidedly bluer than the males, which seem to be always green." (May 12, 1937.)

Osmia morongana, new species

FEMALE.—Length 7.5 mm., anterior wing 6 mm., width of abdomen about 2.7 mm.; robust, blue-green; the antennae, tegulae and legs black. Hair on head and thorax long and mostly white, but black on middle of face (long and white at sides of face), mainly black on mesopleura, but some white hair in front, an admixture of long black hairs on vertex and thoracic dorsum. Tongue bright orange-ferruginous (in various related species it is black or nearly so). Mandibles broad, strongly tridentate; apical half of clypeus black, but clypeal margin straight and even, somewhat pallid; a shining spot at upper margin of clypeus; front dull, appearing granular from the very dense punctures, dark green; vertex shining between the punctures. Mesothorax dull and very densely punctured, posteriorly shining between the punctures; scutellum with a shining band in middle; sides of metathorax with white hair; mesopleura densely punctured. Wings dusky; distance of first recurrent nervure from base of second cubital cell almost or quite equal to length of first intercubitus. Legs with scanty pale hair, brownish on inner side of the broad hind basitarsi; the hind basitarsi, viewed in an oblique light, appear to have a ridge down the middle; spurs black. Abdomen short and broad, the first three tergites shining, the others dull; ventral scopa wholly black.

California: Morongo, April 20, at flowers of *Lupinus* (W. P. Cockerell). In my table of *Osmia* (University of Colorado Studies, XVI, 1928) it runs to 62 but, as the hair of pleura is partly light, it might be sought under 63, where it runs out at *O. phaceliae*, the front not being brightly colored. But it goes more correctly under 71, and there runs out near *O. hypoleuca*, or could possibly go near *O. senior*, differing by the tridentate mandibles. In the Sandhouse table of Californian *Osmia* it runs out at 25. This species and the next were unknown to Timberlake, but I refrained from describing them, supposing it likely that Charles Michener had described them in manuscript. Recently he visited me, and on examining them found that this was not the case.

Osmia lupinicola, new species

FEMALE.—Length about 8 mm., anterior wing 6 mm.; robust, the head and thorax dull bluish green, the abdomen shining yellowish green; mandibles, antennae (flagellum very faintly brownish beneath), tegulae and legs black. Hair of head and thorax abundant, white, some long dusky hairs on scutellum, not conspicuous; when the face is seen from above, the hair at sides appears brilliant pure white, that in clypeal region distinctly grayish. Mandibles strongly tridentate; clypeal margin simple; front very dull and densely punctured; vertex little shining, but a polished spot laterad of each lateral ocellus. Mesothorax dull and densely punctured; scutellum very hairy, yellowish, contrasting with mesothorax; base of metathorax dull. Wings dusky; first recurrent nervure about as far from base of second cubital cell as length of intercubitus. Legs with much short white hair, slightly brownish on inner side of hind tarsi; spurs black. Abdomen broad, shining, the apical part dull; tergites with inconspicuous thin white hair-bands, weak or failing in middle, the sixth densely covered with white hair; ventral scopa shining white at sides, blackish or dark gray in middle.

California: Morongo, April 20, at flowers of *Lupinus* (W. P. Cockerell). In my table it runs out at *O. coloradella*, the tibiae not being blue. In the Sandhouse table it goes near *O. seclusa*, but that is larger with entirely black ventral scopa, and quadridentate mandibles.

Xylocopa arizonensis Cresson

Arizona: Yuma, March (U. L. Smith).

Ceratina arizonensis Cockerell

Arizona: Yuma, March, in hollow twig (Geo. Edwards).

Halictus sisymbrii Cockerell

California: Perris, at flowers of *Oenothera bistorta veitchiana* Hooker, April 11, female (W. P. Cockerell).

Halictus punctatoventris Crawford

California: Riverside, at flowers of *Eschscholtzia* in garden, April 18 (Cockerell); Phelan, April 26 (Cockerell). These are females, and were determined by Timberlake.

Augochlora pomoniella Cockerell

California: Morongo, April 20, female (Cockerell).

Agapostemon angelicus Cockerell

Arizona: Dublin, March 8, females (T. D. A. and W. P. Cockerell).

California: Andrade, at *Sphaeralcea*, March 29, female (Estelle Dingess).

Agapostemon melliventris Cresson

Arizona: Yuma, spring of 1937 (R. M. Young). Female, the femora red at base, not black as in Cresson's type.

Andrena enceliarum, new species

MALE.—Length about 10 mm., anterior wing 8.5 mm., width of abdomen about 3.5 mm.; entirely black, including mandibles and tegulae, the flagellum very faintly brownish beneath. Head subcircular seen from in front, inner orbits nearly parallel; mandibles ordinary, rufescent at tips; process of labrum broadly truncate; malar space linear; third antennal joint a little longer than fourth; clypeus prominent, convex, shining, with distinct well-separated punctures; front dull, but a shining region above tops of eyes; cheeks ordinary, with much long hair; head and thorax with very long, outstanding, rather dull white hair. Mesothorax dull, very minutely punctured, moderately shining on disc; scutellum shining, with fine punctures, its anterior margin gibbous; area of metathorax poorly defined, dull and granular, the metathorax covered with long hairs. Wings hyaline, a little dusky at apex; stigma slender but well developed, rusty black; nervures dark brown; basal nervure falling short of nervulus; second cubital cell narrowed above, receiving recurrent nervure beyond middle; third cubital on marginal about equal to second. Legs black, with pale hair, slightly yellowish on inner side of tarsi. Abdomen very broad, oval, first tergite shining, the others with margins broadly polished; first tergite with thin whitish hair on sides and posteriorly; second to fifth with very thin inconspicuous bands, interrupted on first two; apex with dense white hair, apical plate emarginate; venter with four thin grayish-white bands; tergites at extreme sides strongly developed, overlapping venter, the sides of the abdomen, seen from above, showing strong constrictions.

Arizona: Dublin, at flowers of *Encelia,* March 7, 1937 (Cockerell).

A peculiar species, known by the broad shining abdomen with tergites gibbous at sides, and the gibbous scutellum, with very deep scutello-mesothoracic suture. In my manuscript table it runs near A. *occidentalis* (Cockerell), which is entirely different, the cheeks with a sharp crest behind. But except for the slightly shorter wings, it runs near *A. argentiniae* (Cockerell), to which it is more nearly allied, differing conspicuously by the smaller head, with convex, polished, clypeus, the dark stigma, the wings not brown and other characters. The cheeks are subangulate behind, but very hairy, and the angle is about opposite the middle of the eye, so that in Viereck's table of northwestern species it it would run nearest to *A. decussata* Viereck, from Pullman, Washington, but in that species (which is smaller) the second cubital cell receives the recurrent nervure before the middle.

Andrena prunorum arizonensis (Viereck and Cockerell)

Arizona: Gila River bridge, near Dome, at flowers of *Salix,* March 7, 1937 (Cockerell). Three males were taken; two with the typical dark abdomen and black legs, and one with the abdomen broadly

ringed with bright red on first four tergites, and the legs red except at base. All have the clypeus light yellow with two black dots.

This was described from the female, as a distinct species, but has later been held to be a form of *A. prunorum* Cockerell. These males differ from the *A. prunorum* by the dark brown tegulae, the distinct bluish tint of the abdomen, and the considerably narrower apical depression of second tergite. Although the dark color of the abdomen is not constant, a recognizable subspecies is indicated.

Very closely allied to this, with the dark tegulae and narrow depression of first tergite, is *A. fracta* Casad and Cockerell. The male *A. fracta* is smaller than that of *A. arizonensis*, and the abdomen is not bluish.

Andrena flandersi Timberlake

California: Morongo, 2600 ft., April 22, 1937 (Cockerell). Determined by Timberlake.

Andrena mimetica falli Cockerell

California: Morongo, one female at flowers of *Isomeris arborea angustata* Parish, April 21, 1937 (Cockerell).

Concerning this form, see a paper by E. Gorton Linsley, shortly to be published.

Andrena (Pterandrena) plumifera Cockerell

California: Phelan, April 26, 1937 (J. L. Sperry). The hair of the thorax above is pale, not strongly fulvous as in the type, but the species is the same.

Diandrena sperryi, new species

FEMALE.—Length 7 mm., anterior wing 5 mm.; robust, dark green, the mesopleura and metathora bluer; hair of head and thorax abundant, grayish white; eyes black. Head large, the facial quadrangle broader than long; mandibles black, long and curved, simple; process of labrum narrow, highly polished, emarginate at end but this is not apparent when seen from above; clypeus convex, shining, with a smooth median line, and not very dense strong punctures; facial foveae dull white, rather narrow, occupying less than half the distance between antenna and orbit; vertex mainly dull, but a shining pit laterad of each lateral ocellus; antennae black, the flagellum rufescent beneath apically. Mesothorax shining on disc, finely punctured; scutellum rather coarsely and densely punctured, but shining in middle; area of metathorax well defined, triangular, with delicate but well-defined plicae; tegulae very dark, almost black. Wings hyaline; stigma large, dilute reddish with a dark border; second cubital cell receiving first recurrent nervure at a distance from base at least as great as length of first intercubitus. Legs black, with pale hair, hind knees dark; tibial scopa of mostly long simple hairs, but those on dorsal side plumose.[1]

[1] The pollen carried is globular, spinulose, yellow, evidently from a species of Compositae.

Abdomen broad, polished, weakly punctured, with only feeble indications of bands, the narrow depressed margins pallid; hair at apex pale, a little stained with brownish; venter practically black. There is no black hair at sides of face.

California: near Adelanto, in the Mojave Desert, April 26, 1937 (Cockerell). A second specimen, taken on the same day at Phelan, is considerably smaller and less robust, but is I think surely the same species. Mr. Timberlake examined these specimens, and found them to be different from all those in his collection. The following key separates this from several superficially similar small forms:

1.—Abdomen olive-green, not polished, with three very distinct white hair-bands *beatula* Cockerell.
Abdomen not thus olive-green and banded....2.
2.—Abdomen entirely dull, dark bluish; stigma solid dark brown. *cyanosoma* Cockerell.
Abdomen evidently shining....3.
3.—Thorax dark blue; stigma large, solid reddish brown....*marinensis* Cockerell.
Thorax green....4.
4.—Stigma pale reddish with a dark margin; area of metathorax reticulate-plicate, the metathorax on each side of the area reticulate....*sperryi*, new species.
Stigma solid brown....5.
5.—Wings clear hyaline (on *Calandrinia*).....new species Timberlake, Ms. (male).
Wings dusky....6.
6.—Tergites with broad pallid margins....*puthua* Cockerell.
Tergites without pallid margins.....new species, Timberlake Ms. (female).

D. beatula is taken by Timberlake at Riverside on flowers of *Baeria gracilis* (De Candolle). I have named this species after the ardent lepidopterist, J. L. Sperry, who was with me when it was found. Timberlake finds he can divide *Diandrena* into two groups one visiting Onagraceae, the other the spring Compositae. In the former the scopa is composed entirely of long simple hairs. Up to the present time 19 species of *Diandrena* have been described, all but four coming from California.

Parandrena papagorum (Viereck and Cockerell)

Arizona: Gila River bridge, near Dome, at flowers of *Salix*, March 7, 1937, females (Cockerell, Hobart, Dingess). This peculiar species was described under *Andrena;* Timberlake refers it to *Parandrena*, which seems to be the best disposition of it.

Mr. Timberlake writes that he has taken 398 species of bees at Riverside. This must be by far the greatest number known from any one locality. Robertson, collecting intensively for many years about Carlinville, Illinois, got 297 species.